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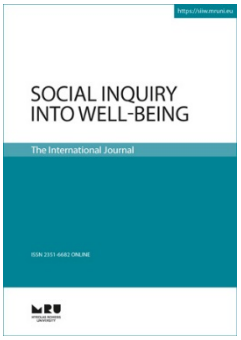

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The Grass is Greener: How Greenery Impacts the Perceptions of Urban Residential Property

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Abstract

Can different types of greenery improve the perceived value, safety, prestige, coziness, and aesthetics of multistory residential buildings? To find the answer, two studies were carried out. In Study 1, participants filled in questionnaires designed to measure the perceived value, safety, prestige, coziness, and aesthetics of a building. Every questionnaire was accompanied with one of four images of the same residential building, the only difference between them was the type of greenery present near the building. Participants were asked to evaluate the building in the image by filling in the questionnaire. A convenience sample of 238 university students (mean age 20, SD = 2) participated in the experiment. Study 2 was an internet-based survey in which participants were presented with four images of a residential building and were asked to identify the most cozy, most expensive, most prestigious, most safe, and most aesthetic building. The pictures were the same as in Study 1. A snowball sample of 356 respondents (mean age 30, SD = 11) participated in the survey. The results indicate that buildings with sophisticated greenery and plain grass greenery are perceived most favorably, while unkempt and chaotic greenery were found to be associated with worse overall perceptions and decreased perceived value of residential property. When creating green spaces near residential buildings, we recommend considering plain grass greenery as it is the most cost-effective solution and has a positive effect on the perceptions of residential property and its value.

Keywords: urban, residential, greenery, perceptions, value

1. Introduction

People often feel the need to get away from others, the urban environment, or the routine of their everyday life (Bhatti & Church, 2004), and public green spaces may effectively serve this need. Public green spaces, such as parks, gardens, or the plots of land near residential buildings have the potential to serve at least some of the citizen's recreational needs and even may have some therapeutic value as well (Yeo, Noor, & Lee, 2013; Young, 2011; Jim & Shan, 2013; Sreetheran & van den Bosch, 2014). Researchers tend to agree, that urban green spaces have a positive effect on people's physical and psychological wellbeing (Hofmann, Westermann, Kowarik, & van der Meer, 2012; Jansson, Fors, Lindgren, & Wiström, 2013; Jiang, Chang, & Sullivan, 2014; Jim & Chen, 2006; Sreetheran & van den Bosch, 2014; Weber, Kowarik, & Säumel, 2014; Wolch, Byrne, & Newell, 2014; Zhang, Chen, Sun, & Bao, 2013). “Wellbeing depends on a range of social conditions that have value for individuals, families and communities such as health, housing, family relations, personal security, employment and leisure” (Boreham, Povey, & Tomaszewski, 2013, p. 166). Green spaces improve urban environments by reducing pollution

(Escobedo, Kroeger, & Wagner, 2011; Nowak, Crane, & Stevens, 2006), reducing noise (Pathak, Tripathi, & Mishra, 2011), regulating temperature (Gabriel & Endlicher, 2011; Hamada & Ohta, 2010), and have the potential to promote and preserve biodiversity (Alvey, 2006; Kowarik, 2011). Urban green spaces also have been shown to have a positive effect on physical and mental health (Barton & Pretty, 2010; Bowler, Buyung-Ali, Knight, & Pullin, 2010; Grahn & Stigsdotter, 2010; Lee & Maheswaran, 2011; Tzoulas et al., 2007; R S Ulrich, 1984; van den Berg, Maas, Verheij, & Groenewegen, 2010) and provide a place for recreational (Arnberger, 2006) or health promoting activities (Babey, Hastert, Yu, & Brown, 2008; Cohen et al., 2007), reducing stress and attentional fatigue (Alvarsson, Wiens, & Nilsson, 2010; Beil & Hanes, 2013; Berman, Jonides, & Kaplan, 2008; Berto, 2005; Hartig, Evans, Jamner, Davis, & Gärling, 2003; R. S. Ulrich, 1981; Roger S. Ulrich et al., 1991). Additionally, public green spaces may enhance social interaction and stimulate social cohesion (Coley, Sullivan, & Kuo, 1997; Jakovlevas-Mateckis, 2006; Peters, Elands, & Buijs, 2010). Public green spaces can be altered to enhance the value and overall image of the neighborhood, therefore creating green spaces can be an effective investment that benefits the residents not only psychologically (Kullberg, Timpka, Svensson, Karlsson, & Lindqvist, 2010; Morrison, 2007), but financially as well (Henry, 1999; Jim & Chen, 2006; Wachter & Wong, 2008).

The financial benefits of the landscaping of single family homes have been studied quite extensively. For example, we know that the price of a single family home can increase from 2% to even 13% just because of its greenery (Anderson & Cordell, 1988; Behe, Hardy, & Barton, 2005; Dombrow, Rodriguez, & Sirmans, 2000; Henry, 1999; Jim & Chen, 2006; Morales, 1980; Wachter & Wong, 2008). The increase in property value is largely due to the type of vegetation used for landscaping, its size, and aesthetic composition. If at least five trees are present at (or visible from) a piece of residential property, the price of the property may increase by up to five percent (Anderson & Cordell, 1988). Large bushes, trees (Morales, 1980), especially mature trees (Dombrow et al., 2000), sophisticated and artistic landscapes containing trees (Luttik, 2000) significantly increase property value. On the other hand, mid-sized vegetation may not have a significant effect on property value, while foundation only planting may even have a negative effect on property value (Behe et al., 2005). In an urban environment, green spaces were found to increase the rental rates of office buildings (Laverne & Winson-Geideman, 2003) and the price of high-rise residential buildings as well (Jim & Chen, 2010). Therefore, it is reasonable to say that greenery can play a significant role in enhancing societal wellbeing by increasing residential property value at a relatively low cost.

Some research has been done to investigate the various effects green spaces can have on people's opinions on residential or public property. For example, dense vegetation usually obstructs one's ability to see, and the obstruction of view by vegetation decreases ones sense of comfort and safety (Jansson et al., 2013; Zhang et al., 2013). However, it has to be noted that one's sense of safety felt in green spaces depends not only on environmental, but also individual factors, such as gender and especially previous experiences (Jiang et al., 2014; Sreetheran & van den Bosch, 2014). The density of vegetation in green spaces also affects the value of property and its rental rates (Anderson & Cordell, 1988; Laverne & Winson-Geideman, 2003), therefore it is reasonable to assume that the value of a given piece of property is related to the subjective evaluations of its safety and coziness.

In designing green spaces, and in architecture in general, the opinion of the expert, as well as the dominant design traditions and tendencies, may not be representative of the needs of the society (Hofmann et al., 2012). Only by analyzing the opinions of people regarding various green spaces, can we determine the pros and cons of various landscaping solutions and thusly come up with an evidence-based way of constructing urban green environments (Jim & Shan, 2013) that improve societal wellbeing. Green spaces that are perceived as unsafe, filthy, or promoting criminal activity can be effectively changed and these perceptions can be reversed (Seymour, Wolch, Reynolds, & Bradbury, 2010), increasing the time and variety of recreational activities in these spaces (Zhang et al., 2013). However, most of the studies that investigate the effects of various green spaces on people's perceptions of these spaces are being done in the USA and densely populated Asian countries, and therefore can be culturally biased and not apply to Lithuania or Eastern Europe in general. As a matter of fact, a particular climate (Behe et al., 2005), social and cultural context, and traditions (Weber et al., 2014) can also have some impact on the perceptions of green spaces. We were unable to find any studies investigating the effect of various landscaping solutions on the perceptions of residential buildings in Lithuania, and therefore we are forced to conclude that there is (at least for now) no clear evidence-based way of landscaping green spaces near urban residential buildings.

In Lithuania, multistory residential buildings have to have at least 30% of all land property dedicated to green spaces, which may consist of lawns, flowerbeds, and recreational spaces – playgrounds for children and places for senior citizens to relax. However, there is a lack of regulations regarding the quantity and quality of various green spaces in urban environments (Jakovlevas-Mateckis, 2006). Most green spaces near multistory residential buildings are public property and therefore are maintained by the public, namely – the residents of nearby buildings. In some cases the community of a residential building may opt to pay someone to take care of the landscape. One possible solution to improve green spaces near multistory residential buildings is to develop city-wide or district-wide landscaping plans, however, the lack of unifying landscaping regulations prevents this solution (Alchimovienė & Gudienė, 2010). A step forward would be to at least determine what landscaping solutions could be beneficial for the society.

The present studies are aimed at determining the effects of various landscaping solutions on the perceived value, safety, prestige, coziness, and aesthetics of multistory residential buildings and by doing so provide an evidence basis for creating and improving green spaces near residential buildings. An experiment and a survey were carried out to obtain our goals.

2. Study 1

Study 1 was an experiment, designed to test whether different greenery types affect the various perceptions of residential housing. Participants were presented with images showing a residential building and were asked to fill in a questionnaire, based on what they see in the picture. The pictures showed the same exact building, but the greenery surrounding the building was altered.

2.1. Method

Participants. Participants were a convenience sample of 238 university students from several Lithuanian universities. Participant age ranged from 18 to 34 years, with a mean age of 20 years (SD = 2); 99 participants were male, 138 were female; one participant did not specify his or her age or gender.

Instrument. To measure participants' attitudes towards the presented stimuli, a questionnaire was constructed. The questionnaire addressed five aspects of housing: its aesthetics, its prestige, its perceived value, its perceived safety, and its coziness. Each aspect was measured by three items in the questionnaire. The questionnaire was comprised of 15 items rated on a 7-point Likert scale ranging from "completely disagree" (1) to "completely agree" (7).

To determine the validity of the questionnaire, a fixed five factor principal component analysis using the *Varimax* rotation method was conducted. The analysis indicated that two items loaded not into their predicted factors, therefore these items were omitted and the analysis was rerun. The subsequent analysis showed the data were appropriate for factor analysis (KMO = 0.802; Bartlett's $\chi^2(78) = 877.23$, $p < 0.001$), all items loaded into their predicted factors with loadings greater than 0.5 and the five factor solution could explain 68.47% of total variance. The final version of the questionnaire consisted of 13 items (see Table 1). Questionnaire scales were computed by calculating the average of the ratings of the items belonging to a scale.

Table 1
Questionnaire scales and their internal consistency

		Internal consistency	
Scale	Items in scale	alpha	omega
Aesthetics	This building looks neat; This building looks aesthetically pleasing; This building looks more taken care of than other buildings.	0.71	0.71
Prestige	I think that to have an apartment in this building would be a sign of high status; I think that important and influential people live in this building; I think that this building is prestigious.	0.72	0.73
Perceived value	I believe that apartments in this building cost more than the average apartment; I believe that people would pay more to have an apartment in this building.	0.58	0.58
Perceived safety	I believe that there are no criminals living in this building; It is not scary to be next to this building.	0.54	0.54
Coziness	It would be pleasant for me to live in this building; This building creates a feeling of coziness; This building gives me positive emotions.	0.77	0.78

Stimuli. For the purposes of the study, four images were created (Figure 1), each showing the exact same residential building, however the greenery present near the building differed between the images. We decided to portray four common types of greenery that differ by their maintenance cost and can be encountered in real life: plain grass, expensive greenery, "granny's garden", and neglected greenery.

Figure 1

The four images presented to study participants. Each participant randomly received one of these images attached to a questionnaire and was asked to fill in the questionnaire by rating the building in the image. The images can be described, starting from the top left, as “plain grass”, “expensive greenery”, “granny's garden”, and “neglected greenery”.

Procedure. The participants filled in the questionnaires during lectures. The researcher conducting the experiment introduced himself to the students and explained that he is studying how residential buildings are perceived by the people. The students were informed that the study is completely anonymous and were offered to opt-out of the study if they did not want to participate. All students agreed to participate in the study.

The researcher asked the participants not to talk or look into each other's questionnaires during the procedure. Participants were individually given questionnaires with a picture of a building attached to them. The questionnaires were randomly arranged before the procedure, so each participant was in effect randomly assigned to an experimental group by giving him a copy of the questionnaire. The questionnaires were filled in in roughly six minutes and were returned to the researcher. After all questionnaires were collected from the participants, the participants were debriefed about the true aim and nature of the study.

Statistical analysis. Prior to any statistical tests, all questionnaire scale scores were transformed into Z scores. In order to determine whether the type of greenery near a residential building affected the ratings of the five aspects (aesthetics, prestige, perceived value, perceived safety, and coziness) of that building, we conducted a one-way ANOVA. The data were not normally distributed, however ANOVA has been shown to be robust against violations of normality (Schmider, Ziegler, Danay, Beyer, & Bühner, 2010). Bootstrapping (with a 1000 samples) was used in order to obtain robust confidence intervals for the means of the questionnaire scales.

2.2. Results

A one-way analysis of variance indicated that there was a significant effect of type of landscaping on the ratings of aesthetics ($F(3, 234) = 4.875$, $p = 0.003$, $\omega^2 = 0.05$) and perceived value ($F(3, 234) = 3.301$, $p = 0.021$, $\omega^2 = 0.03$). However, ratings of prestige ($F(3, 234) = 0.413$, $p = 0.744$), perceived safety ($F(3, 234) = 0.966$, $p = 0.409$), and coziness ($F(3, 234) = 0.279$, $p = 0.841$) did not differ between experimental conditions. Descriptives of questionnaire scales in all experimental conditions are presented in Table 2.

Table 2

Raw means, their confidence intervals, and standard deviations of questionnaire scales in all experimental conditions

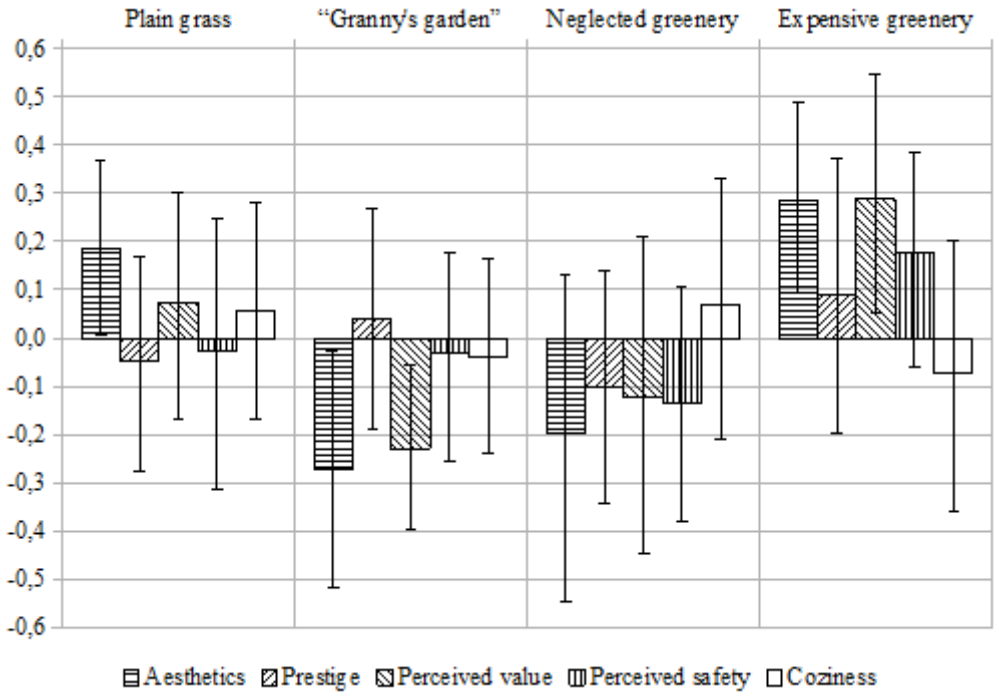
	Plain grass (N = 60)		"Granny's garden" (N = 67)		Neglected greenery (N = 51)		Expensive greenery (N = 60)	
	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI
Aesthetics	6.01 (0.62)	[5.86, 6.17]	5.65 (0.82)	[5.45, 5.84]	5.70 (0.99)	[5.41, 5.95]	6.09 (0.65)	[5.93, 6.24]
Prestige	3.20 (1.04)	[2.95, 3.45]	3.30 (1.14)	[3.03, 3.59]	3.14 (1.02)	[2.88, 3.44]	3.36 (1.25)	[3.06, 3.66]
Perceived value	4.01 (1.22)	[3.73, 4.26]	3.63 (1.00)	[3.40, 3.88]	3.76 (1.39)	[3.40, 4.10]	4.28 (1.28)	[3.92, 4.60]
Perceived safety	4.48 (1.32)	[4.16, 4.78]	4.50 (1.20)	[4.19, 4.78]	4.35 (1.10)	[4.06, 4.64]	4.73 (1.13)	[4.44, 4.98]
Coziness	5.00 (1.13)	[4.73, 5.27]	4.89 (1.11)	[4.61, 5.16]	5.01 (1.12)	[4.69, 5.31]	4.85 (1.34)	[4.49, 5.16]

Note. CI – confidence interval.

A graphical comparison of the mean ratings of aesthetics, prestige, perceived value, perceived safety, and coziness between experimental conditions is presented in Figure 2. The ratings of aesthetics in the "Granny's garden" condition were lower from those obtained in the Plain grass and Expensive greenery conditions; the "Granny's garden" condition also produced lower ratings of perceived value when compared to the Expensive greenery condition. Although no other significant differences were found, one can observe that the Expensive greenery condition produced higher ratings in all areas except coziness, while "Granny's garden" and Neglected greenery conditions produced somewhat lower ratings.

Figure 2

Comparison of mean ratings (presented in Z-scores with bias-corrected 95% confidence intervals) of aesthetics, prestige, perceived value, perceived safety, and coziness between experimental conditions



2.3. Discussion

Two distinct patterns can be observed: The "Granny's garden" and Neglected greenery conditions generally produced more negative ratings, while the Expensive greenery condition generally produced better ratings. Knowing that that the quantity, quality and sophistication of landscaping plays a significant role in evaluating property (Behe et al., 2005; Henry, 1999; Jim & Chen, 2006; Laverne & Winson-Geideman, 2003; Luttik, 2000; Morales, 1980), the overall better ratings in the Expensive greenery condition are not surprising. Despite the fact that the "Granny's garden" and Neglected greenery conditions also had a lot of vegetation, the lack of sophistication and artistic presentation of greenery (Behe et al., 2005) may have influenced the worse overall ratings. It is noteworthy that the Plain grass condition, which, despite lacking any sophisticated design or, in fact, any greenery at all (despite the grass), in general produced good ratings of the aesthetics of the building, as well as its perceived value. This may be indicative that having no greenery at all may be a better option than having unaesthetic or unsophisticated greenery, if one aims to improve the subjective perceptions of a residential building.

3. Study 2

Study 2 was a survey, designed to determine whether people prefer buildings with a certain type of greenery when they are presented with several options to choose from.

3.1. Method

Participants. An Internet survey was carried out, recruiting participants through social media and subsequent snowball sampling. The survey form was accessible from the 18th of November, 2014 and was closed on the 15th of January, 2015. In the time that the survey was accessible, 404 people filled in the survey form. Of those who participated in the survey, 48 were younger than 18 years and their responses were excluded from the final sample. The final sample used in this study consists of 356 participants whose age ranged from 18 to 66 years, mean participant age was 30 years (SD = 11). The sample consisted almost entirely of females (341 females and 15 males).

Instruments. The survey form consisted of seven items. First five items all showed four pictures of residential buildings at the top (the same pictures as in Study 1 were used, see Fig. 1), the pictures were accompanied by numbers in order to identify them. The first five items asked the participants to identify, in which picture the building appears most cozy, most expensive, most prestigious, most safe, and most aesthetic. The last two items asked for the age and gender of the participant.

Procedure. Upon accessing the survey, participants were presented with a form. No personal information except age and gender were gathered in the survey, participants had the opportunity to quit the survey at any point.

Statistical analysis. Chi-square tests were used to test whether the distributions of picture preference differed from those that would be expected if there were no preference for one or more pictures.

3.2. Results

A series of chi-square tests determined that there is a significant pattern in choosing which buildings are most cozy ($\chi^2(3) = 139.73$, $p < 0.001$), most valuable ($\chi^2(3) = 244.88$, $p < 0.001$), most prestigious ($\chi^2(3) = 231.08$, $p < 0.001$), most safe ($\chi^2(3) = 123.98$, $p < 0.001$), and most aesthetic ($\chi^2(3) = 202.9$, $p < 0.001$). The building preference frequencies are presented in Table 3.

Table 3

Frequencies of choosing one of the pictures as depicting a house that is the most cozy, valuable, prestigious, safe, and aesthetic

	Type of greenery presented in the picture			
Rated aspect	Neglected greenery	Expensive greenery	Plain grass	"Granny's garden"
Most cozy	12	166	106	72
Most valuable	7	158	167	24
Most prestigious	7	145	174	30
Most safe	11	134	140	30
Most aesthetic	9	166	144	37

Note. N = 356.

To investigate possible age differences in preferring one type of greenery to another, participants were split into two age groups: those younger than 30 years of age, ant those aged 30 and above (see Figure 3 for a side by side comparison). This was done in order to better represent the opinions of a possible buyer, since purchasing real-estate is usually done by older individuals. A series of chi-square tests were used to determine whether the distributions of greenery preference differed between these age groups. It was found, that the age groups had similar preferences for greenery: the most cozy ($\chi^2(3) = 4.53$, $p > 0,05$), most valuable ($\chi^2(3) = 1.16$, $p > 0,05$), most safe ($\chi^2(3) = 4.61$, $p > 0,05$),

and most aesthetic ($\chi^2(3) = 3.7$, $p > 0,05$) buildings were chosen at the same rate. However, the distributions of building preference differed when participants were asked to identify the picture that depicts the most prestigious building ($\chi^2(3) = 8.23$, $p < 0,05$).

Figure 3.

Age group comparison of image preference, when asked to identify the most cozy, most valuable, most prestigious, most safe, and most aesthetic building. Aged below 30 N = 217, aged 30 and above N = 139. The distributions differ by age group only in the case of identifying the image that depicts the most prestigious building.

3.3. Discussion

Just as in Study 1, the results demonstrate a clear pattern of preferring residential buildings either with expensive and sophisticated greenery, or with a simple lawn, while the buildings that have either neglected greenery or the unsophisticated "Granny's garden" are picked much less frequently. What is surprising, however, is that when people are presented with a clear selection from available greenery, the Plain grass and Expensive greenery pictures are chosen at about the same rate as depicting buildings that are the most aesthetic, prestigious, safe, cozy, and valuable. One would expect that the Plain grass image would be chosen less frequently than the Expensive greenery picture (Behe et al., 2005; Henry, 1999; Jim & Chen, 2006; Laverne & Winson-Geideman, 2003), however, the results indicate that a simple lawn is just as much preferred as a complex and expensive one.

The preferences of greenery were mostly the same for participants who were younger than 30 years and those who were 30 years of age or older. This indicates that if there exists an age difference in preferring a particular type of greenery, it is quite small and overall not worth the differentiation of greenery for particular age groups in planning urban green spaces near residential buildings. It appears that if one aims to improve green spaces near residential buildings for all age groups, creating a simple lawn can be just as effective as creating expensive and complex greenery.

4. General discussion

Our findings are twofold. First of all, we found that expensive and sophisticated greenery can increase the perceived value, prestige, safety, and aesthetics of a building, which is quite similar to what most research finds (Behe et al., 2005; Henry, 1999; Jansson et al., 2013; Jim & Chen, 2006; Luttik, 2000). We also found that unsophisticated and neglected greenery can decrease the perceived value of a residential building, which is also in line with other research (Behe et al., 2005). Secondly, we found that buildings that have a simple lawn can be perceived just as good as those, which have sophisticated and expensive landscaping. This finding was quite unexpected and eye opening.

The findings of this study provide an evidence basis for choosing greenery of urban residential buildings. Perhaps most importantly, our findings show how to improve the perceptions of urban residential property and, in a way, – improve the overall wellbeing of society (Barton & Pretty, 2010; Beil & Hanes, 2013; Jiang et al., 2014; Lee & Maheswaran, 2011; Tzoulas et al., 2007), increasing not only the value of residential property, but also the feeling of safety and coziness it creates. It appears that when creating designs for green spaces near urban residential buildings, the best option is to either choose plain grass, or sophisticated greenery. However, choosing plain grass is much more cost effective and requires much less maintenance. Therefore, landscaping specialists should avoid expensive and hard-to-maintain landscaping solutions, if possible. We should also note that the landscaping of the green areas near residential buildings should not be left to the will of the residents of the building, as this may result either in chaotic and unattractive greenery, or in neglected and unkempt greenery. Both of these scenarios have negative effects on the perceived value of the residential property and are, therefore, undesirable. For policy makers this implies that they should be concerned

not only with the quantity, but also the quality, density, variety, sophistication, as well as maintenance of green spaces.

As all research, our study is not without limitations. The experiment in Study 1 was conducted with a convenience sample, which was rather small. This resulted in data, which were not necessarily representative of the population. It also must be noted, that the stimuli used in Study 1 depicted greenery types that are common in Lithuania and that these types of greenery may be uncommon in other cultures (Behe et al., 2005; Weber et al., 2014), therefore the findings of this study can only be generalized to Lithuania and possibly to Eastern Europe. The internet survey in Study 2 used a snowball sample that consisted mostly of women, which can also be considered as a limitation.

Further research exploring the effects of landscaping on the perceptions of residential buildings could be done using similar designs, but with samples more representative of the average home owner and perhaps using a wider range of stimuli, depicting a broader variety of possible landscaping solutions.

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